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Original Research

A genre-based model of rhetorical structure in scoping review introductions

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As genre modelling advances, describing research articles rhetorical structures becomes crucial. Though secondary to empirical studies, scoping reviews shape scholarly communication by framing analysis and setting epistemological benchmarks. Their introductions act as conceptual lenses, defining interpretive frameworks. However, most rhetorical models, designed for empirical articles, appear to be inadequate for scoping reviews. We propose a genre-based model of rhetorical structure for introductions to scoping reviews. Drawing on a corpus of 40 introductions from Q1 Education journals (2020–2025), we conduct step-by-step move analysis to reconstruct a three-move, nine-step schema tailored to the genre's analytical mission. The methodological framework employs step-by-step rhetorical annotation, focusing on rhetorical functions, linguistic realisations, and deviations from normative structural expectations. Results show two core steps reproduced in ≥ 97% of the corpus (1.1 'scope nomination' and 2.2 'task as reconstruction'), while epistemological positioning (3.2) is comparatively infrequent and often implicit. Median Jaccard of 0.63 indicates a teachable core with optional, stance-related elements; clustering reveals three stable structural profiles. We synthesise functionally efficient phrasings for each step and demonstrate linguistic correlates of stance (e.g., evaluative and hedging verbs/adverbs) relevant to Step 3.2. The model clarifies how introductions to scoping reviews motivate synthesis, frame analytical lenses, and set reconstruction boundaries. Pedagogically, it supports move-aware writing instruction; computationally, it provides patterns for automatic rhetorical tagging and metadiscourse-aware feature design. This study thus contributes to the formalisation and operationalisation of academic discourse analysis.

KEYWORDS: *scoping review introduction, genre analysis, rhetorical steps, epistemological stance, cognitive navigation, syntactic patterns, corpus analysis, genre modelling, academic rhetoric*

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1. INTRODUCTION

The *Introduction* plays a pivotal role in academic research since in this structural component of the research paper, the author establishes the framework for the reader's perception of the entire study, defines its theoretical and pragmatic vectors, and situates the relevance and context of the scholarly contribution (Kosycheva & Tikhonova, 2022). The most widely recognised structure of introductions in research articles, examined in the context of rhetorical strategy analysis, is the Creating a Research Space (CARS) model developed by Swales (1990). According to this model, extensively employed in studies of academic writing and discourse analysis (Nwogu, 1997; Kanoksilapatham, 2005; Zhang & Wannaruk, 2016; Rahman et al., 2017; Ye, 2019; Gao & Pramoolsook, 2023; Farhang-Ju et al., 2024), the introduction of an empirical article unfolds through three fundamental rhetorical moves: establishing a research territory, identifying a niche, and presenting one's own contribution. This structure has been validated both empirically and pedagogically and remains today the foundational framework in most guidelines for writing original empirical research articles (Swales, 2019; Zhou et al., 2023).

In the context of the scoping review genre, the introduction is constructed in a fundamentally different manner, as it pursues distinct research objectives and fulfils a rhetorical function that diverges from introductions in original empirical articles. Unlike the latter, where the introduction aims to establish a new research niche, a scoping review is intended to reconstruct existing knowledge within a given field, uncovering its internal architecture, contradictions, emerging trends, and research boundaries (Arksey & O'Malley, 2005). The rhetorical structure of the introduction in a scoping review reflects the secondary status of knowledge derived from previously accumulated studies. At the same time, its analytical reconfiguration assigns this knowledge a primary role in defining the cognitive frameworks of the investigation (Peters et al., 2020; Mak & Thomas, 2022a; Raitskaya & Tikhonova, 2020; Tikhonova & Shlenskaya, 2021). Unlike the author of an empirical article, who seeks to demonstrate the uniqueness of the research object, the author of a scoping review argues for the necessity of providing an analytical interpretation of already accumulated material (Levac et al., 2010). Consequently, the introduction to a scoping review cannot rely on the Creating a Research Space model in its canonical form, as that framework is designed for empirical knowledge production and is therefore insufficient for the analytical reconstruction of a research field.

The introduction to a scoping review requires a distinct rhetorical logic. The emphasis must shift from identifying a 'gap' to articulating the motivation for analytical mapping of the subject field. It is crucial to demonstrate why its holistic understanding is currently problematic, what epistemological (i.e., the author's position within a scientific tradition — e.g., positivist, interpretivist, critical-realist, pragmatist), conceptual (competing definitions, constructs, and operationalisations), or institutional discontinuities (policies, standards, editorial conventions, funding or curricular constraints) hinder such understanding (Thomas et al., 2019; Mak & Thomas, 2022b), and on what grounds the author proposes to reconstruct the subject field as an integrated system (Arksey & O'Malley, 2005; Tikhonova & Shlenskaya, 2021). Accordingly, the focus of the introduction in a scoping review is not on advancing a hypothesis or an empirical research question, but rather on justifying the necessity of synthesis, reinterpretation, and the systematic organisation of scholarly knowledge.

There exists a substantial body of research and methodological guidelines addressing both the conceptual foundations and structural features of scoping reviews (Arksey & O'Malley, 2005; Peters et al., 2020; Mak & Thomas, 2022a). These works have established the basis for understanding the logic of constructing scoping reviews, their epistemological mission (Thomas et al., 2019), and their procedural standards (Mak & Thomas, 2022b), including the systematisation of search stages, selection criteria, and methods of synthesis. A separate line of inquiry has focused on rhetorical strategies employed in the *Discussion* sections of scoping reviews, with particular attention to the ways in which findings are interpreted and positioned within the broader landscape of academic knowledge (Tikhonova et al., 2025). At the same time, despite the accumulated methodological foundation, the rhetorical organisation of introductions to scoping reviews has not been systematically conceptualised as an independent object of analysis. Yet it is the introduction that establishes the conceptual and cognitive frameworks of the study, delineates the boundaries of the subject field, articulates the aims and objectives of the reconstruction, and shapes readers' expectations regarding the logic and analytical rigor of the scoping review. The absence of detailed recommendations in this regard creates a notable gap within existing guidelines.

The aim of our study is to describe and formalise the rhetorical structure of introductions in scoping reviews, based on the initial hypothesis that this genre requires a specific rhetorical framework determined by its functional objectives. Drawing on a corpus of 40 scoping reviews in Education published in Scopus Q1 journals, the authors reconstruct a genre-based rhetorical model, analyse its key moves and steps, and identify the cognitive and rhetorical strategies most frequently employed by authors to legitimise and structure their analytical synthesis. Although our analytical unit is the rhetorical step rather than linguistic features, such positioning typically correlates with stance resources in the sense of Hyland (2005) (hedges, boosters,

attitude markers, self-mention; interactive/interactional guidance) and with evaluative patterns described by Martin and White's (2005) Appraisal framework. The proposed model is intended to be of value both to researchers working in the field of discourse analysis and to authors seeking to deliberately design functionally coherent scoping reviews.

2. MATERIAL AND METHODS

2.1. Corpus

For the purposes of the analysis, a corpus was compiled consisting of 40 scoping reviews published in Q1 journals according to the top 50 ranking of the *Scimago Journal Rank (SJR)* in the subject area of Education (see Appendix 1), as of February 2025. Articles were included in the corpus if they met the following criteria: (i) explicit identification of the genre as a scoping review; (ii) the presence of an extended and structurally distinct Introduction section accounting for no less than 10% of the total article length; (iii) availability in open access; (iv) written in English.

We restricted the corpus to Q1 Education journals for substantive (not merely logistical) reasons: (i) the field exhibits a high volume and diversity of scoping reviews, which is conducive to stable pattern induction; (ii) top ranking journals on Education maintain consolidated editorial conventions, enhancing comparability of introductions across venues; and (iii) the findings have direct pedagogical relevance for genre instruction in education, where move-aware writing is routinely taught. This was therefore a disciplinary choice rather than a methodological convenience.

Journals were selected considering their impact factor. The choice of top-ranked journals as the source for corpus construction was determined by both methodological and substantive considerations directly related to the aims and orientation of the study. Since the primary task was to identify the functional rhetorical structure of introductions to scoping reviews, high-quality samples of academic writing that had undergone a multi-stage process of editorial and peer review were prioritised. High-ranking journals classified as Q1 in Scopus provide the necessary level of academic standards, which include structural clarity, genre adequacy, and discursive reflexivity. Such journals propose the most stable and normative rhetorical practices that can be observed. These practices on the one hand represent the current scientific tradition and on the other hand serve as models for emulation within the academic community. Peer-reviewed articles in these journals are distinguished by a high degree of authorial responsibility in positioning the review as an independent scholarly contribution. This is especially relevant for the purposes of the present study, where the introduction is understood not as a formal preface but as a key site for the epistemological and methodological formulation of aims and parameters of analysis. The exclusive selection of sources from high-ranking journals made it possible to eliminate random or non-representative deviations from genre conventions that might otherwise have distorted the model.

The articles were coded according to the source number recorded in the source register, which ensured convenience for comparison and for subsequent verification of the data (Appendix 2). Data extraction was carried out manually based on pre-prepared Word files containing the text of the *Introductions* from pre-coded PDF versions of the articles. In each article, only *the Introduction* section was examined; we did not include in the analysis texts from stand-alone subsections such as *Literature Review* or *Theoretical Background.*

2.2. Methods and research procedure

To identify and systematise the rhetorical structure of the *Introduction section* in scoping reviews, the present study employed the principles of move analysis developed by Swales (1990, 2019) and further elaborated in research on academic discourse.

During the manual step-by-step annotation of the corpus consisting of 40 *Introductions*, a flexible procedure of rhetorical analysis was applied. Annotators recorded functionally relevant segments of text that were presumed to fulfil a particular rhetorical function. These fragments were recorded with an indication of their assumed role, such as establishing the research field, pointing to epistemological gaps, or outlining analytical frameworks. The annotated segments were then compared across the articles.

Based on a comparative analysis of realisations across different articles, stable patterns were identified that made it possible to group functionally similar elements into more generalised categories. In this way, the steps of the model were reconstructed inductively: the frequency of occurrence, the rhetorical position, the lexical-syntactic formulas, and the contextual use of specific elements provided the criteria for identifying and validating each step. In the process, the following were recorded: (i) variable and recurrent patterns that allowed the identification of typical linguistic markers; (ii) cases in which the functional load was divided between several parts of the text; (iii) implicit realisations, such as the absence of an explicit statement of purpose combined with the presence of a clear epistemological framing; (4) combined expressions that merged two or more steps into a single rhetorical construction.

Once the authors had synthesised the rhetorical patterns and formalised them into a genre-based rhetorical model (for consistency, we hereafter refer to the proposed three-move, nine-step schema as the *genre-based rhetorical model*) of the *Introduction*, all texts were re-annotated using the refined set of moves and steps. This second round of annotation served to test how well the model captured the

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actual diversity of structures and made it possible to refine it where necessary. Thus, the annotation functioned not only as an instrument of analysis but also as a means of incrementally constructing the model itself, grounded in the empirical data of the corpus. We did not code metadiscourse as an analytical category; all quantitative counts and statistics refer to rhetorical steps as specified in the coding scheme. References to metadiscourse in this article are prospective and operational (as candidate surface features for future automatic tagging), not part of the present analytical inventory.

2.3. Instruments

During the annotation process, functional criteria for identifying each rhetorical step were empirically established, a coding table was compiled (see Data Availability Statement), and typical lexical-syntactic markers and rhetorical formulas representative of the steps in the corpus were identified.

To systematise the data and ensure the reproducibility of the analysis, a formalised coding table was developed, serving as the main instrument for annotating the rhetorical structure of introductions in scoping reviews. The table integrates parameters that capture both the presence and the manner of the realisation of rhetorical steps in the introduction, as well as the linguistic and discursive features of their expression. Each row of the table corresponded to a single step within a single article (Table 1).

2.4. Criteria for the identification of rhetorical steps in the text

After the development of the coding table, which recorded the structural features, recognition criteria, and typical markers of rhetorical steps, a systematic process of corpus annotation was undertaken. This procedure was iterative and ensured the transition from the conceptual model to its empirical application. The purpose of the annotation was not only to establish the presence or absence of specific steps in the structure of the *Introduction* but also to capture the particularities of their rhetorical realisation, the degree of the patterns' originality, and the level of analytical density.

The following section describes in detail the stages of annotation and the logic of their correspondence to the theoretical model.

The annotation procedure was carried out independently by two annotators after a preliminary agreement on the interpretation of the model during a pilot coding exercise, which relied on jointly formulated recognition criteria for rhetorical moves and steps (Table 2). To assess inter-rater reliability, Cohen's Kappa coefficient was employed, which yielded a value of 0.81. According to the interpretation provided by Landis and Koch (1977), this corresponds to a high level of agreement. Cases of disagreement were discussed until consensus was reached, and the final version of the annotated data was used for subsequent analysis.

Table 1
Coding table: Structure and purpose of the columns

COLUMN TITLE	PURPOSE	DATA FORMAT / EXAMPLE
Article ID	A unique identifier of the article in the corpus	1_1, 1_2, ...
Journal title	Indicates the type of journal	Computers and Education: Artificial Intelligence
Move	Indicates which of the three rhetorical moves the step belongs to	1, 2, 3
Step	Specific analytical step within the move	1.1, 2.3, 3.2
Realisation	Indicates whether the step is present in the article	1 = fully realised
Type of rhetorical explication	Specifies the form of expression of the step	0.5 = partial / implicit
Textual realisation	Extract from the Introduction where the step is implemented	2 = absent
Type-related comment	Explains the rationale for classification (e.g., why analytical rather than formulaic)	Formulaic
Linguistic and rhetorical markers	Key verbs and adjectives serving as indicators of the step realisation	Analytical
Outlier / Anomaly	Identifies inconsistencies in logic or structure, unclear or erroneous realisations	Implicit

Table 2
Criteria for identifying rhetorical steps and moves in the introduction of a scoping review

CRITERION	DESCRIPTION	EXAMPLES AND INDICATORS
Functional purpose of the statement	The primary criterion is that it determines what cognitive or argumentative function a text fragment performs (for example, delineating the subject field, establishing value, or defining the framework) to align the statement with the functional content of a specific rhetorical step.	(i) Indication of the existence of the subject. (ii) Motivation for conducting the review. (iii) Development of the analytical framework. (iv) Interpretation of the subject field structure.
Thematic content	The presence of lexical items and thematic constructions associated with the key elements of the step: 'field', 'trend', 'framework', 'gap', 'synthesis', 'mapping', 'cluster', etc.	(i) *'This review focuses on...'.* (ii) *'Despite growing literature on...'.* (3) *'We identified four dominant clusters...'.*
Logical and discourse markers	The use of typical discursive signals that structure the statement and mark its rhetorical function.	(i) Aim: *'this review aims to...', 'the main objective is...'.* (ii) Motivation: *'due to recent developments...', 'despite the increase in...'.* (iii) Framework: *'we organise the literature into...'.*
Position in the text structure	Certain steps typically occur in specific positions. For example, Step 1.1 almost always appears in the first paragraph, while Step 3.3 is usually located closer to the end of the introduction.	(i) Beginning: presentation of the subject field. (ii) Middle: problem or task. (iii) End: analytical framework and scope of analysis.
Presence of a pattern having the characteristics of a typical construction (or, conversely, analytical construction)	The combination of words can either be typically formulaic ('growing body of research...') or individual and analytically dense.	(i) Formulaic: *'This review aims to provide a comprehensive overview...'.* (ii) Analytical: *'While research on X has proliferated, its methodological grounding remains scattered across incompatible paradigms.'*
Contextual inference	The conclusion about the presence of a move/step can be drawn not only from a single sentence but also from the surrounding context, such as paragraph logic or transitions between ideas (implicit presentation).	Even without explicit markers, the aim or framework can be inferred from the construction of the argument.

The set of criteria developed for identifying rhetorical moves and steps served as the basis for distinguishing types of rhetorical explication. The typology of explication (formulaic, analytical, implicit) (Table 3) was formulated iteratively during the annotation process and agreed upon between annotators during the pilot coding trial. In cases where the explication combined features of several types, for example, a standard formula followed by analytical elaboration, a dual label was allowed (for instance, 'analytical—formulaic'). Such hybrid realisations accounted for less than 10 percent of all cases and were subsequently excluded from the distribution counts to avoid distortion of the overall picture.

2.5. Data analysis

Both quantitative and qualitative methods were employed in the analysis of the annotated corpus, with the aim of identifying the frequency and structural characteristics of rhetorical step realisations.

2.5.1. Quantitative analysis

The quantitative analysis focused on determining the frequency and structural patterns of rhetorical step realisations in the introductions of scoping reviews. First, a frequency count was conducted for each step across the corpus, considering three levels of manifestation: explicit (value 1), implicit (0.5), and absent (2). The resulting data

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Table 3
Criteria for identifying the type of rhetorical explication

TYPE OF EXPLICATION	DEFINITION	LINGUISTIC FEATURES	COMMENTARY
Formulaic	A stable, recurring pattern is used; rhetorical patterns may be duplicated across articles (example: *'a growing body of research…'*). The step is realised formally without individual authorial variation.	(i) The use of impersonal constructions. (ii) The absence of conceptual, source-related, or contextual specification.	It is often presented as formulaic phrases widely used in scholarly communication (for instance, *'recent studies have shown that…'*). It may appear in several articles almost verbatim.
Analytical	The step is realised with elements of reasoning, comparison, and specific justification; the pattern is original and contextualised.	(i) Explicit statement of causes, logic, and consequences. (ii) Reference to specific directions, schools, or contradictions. (iii) It may include contrastive argumentation or problematisation. (iv) The use of cognitive verbs such as 'suggests', 'reveals', 'demonstrates'.	It reflects a distinct authorial stance and mastery of the subject field. It is often accompanied by scientific problematisation, reference to conflicts, or identification of gaps.
Implicit	The step is realised but not formally marked; the reader has to interpret it through the logic of argumentation.	(i) The absence of explicit step-signalling (e.g., the aim is not a separate structural element). (ii) The meaning can be inferred from the flow of reasoning, paragraph transitions, or evaluative statements. (iii) Evaluative claims without an explicitly stated task: *'Many contributions on this topic are difficult to reconcile…'* (implying methodological diffuseness, namely Step 1.2).	It requires interpretation by the annotator. The step may be realised in one or several paragraphs. It is acceptable only under conditions of high inter-rater agreement and supporting context.
Mixed (optional)	The segment combines a formulaic phrase with elements of authorial analysis. It is typically used as a transition between rhetorical functions.	(i) The step starts with a cliché or template, followed by reasoning or specification. (ii) A standard aim combined with an analytical focus (for example, aim + description of conflicting schools).	It is possible in complex cases, especially when describing the scope or relevance of the subject field.

Note. In cases of divergence in classification (for example, when one annotator considered a step analytical whereas another believed it was implicit), the discussion was guided by the following criteria: the semantics of key verbs and connectors, the degree of specificity and originality of the pattern, and the role of the segment within the overall argumentation.

were examined both in absolute terms and as percentages of the total number of articles. The Gini coefficient was applied to assess the degree of asymmetry in the distribution of steps within the corpus, which made it possible to identify those rhetorical elements that appear consistently and those that occur only sporadically.

To compare the structures of introductions across individual articles, the Jaccard index was applied, calculated based on binary vectors of step presence. This approach made it possible to measure the degree of similarity between the rhetorical profiles of the texts. Subsequently, to identify stable groups with closely aligned structural organisation of introductions, agglomerative hierarchical cluster analysis was conducted on the Jaccard matrix, using the complete linkage method. All calculations were performed in Microsoft Excel.

2.5.2. Qualitative analysis

The qualitative analysis was aimed at interpreting the ways in which rhetorical steps were realised and at identifying the variable patterns of their explication in academic discourse. Particular attention was paid to the linguistic and discursive means by which the steps of the model were rendered explicit, as well as to the differences in the type of patterns, whether formulaic, analytical, or implicit.

At the first stage, all instances of rhetorical steps were examined manually in terms of their typical structure, lexical density, and the degree of authorial reflexivity. Based on this analysis, explication types were classified, and stable rhetorical constructions and formulas characteristic of specific steps were identified. In cases of implicit realisation, attention was directed to contextual features and the logic of argument development that allowed the utterance to be assigned to a specific step. Instances were also identified where a single rhetorical step was divided into several semantic units, merged with other steps, or only partially realised. All observations were accompanied by annotations and comments recorded in the coding table, enabling the construction of a general inventory of efficient patterns and rhetorical strategies applicable to the design of introductions to scoping reviews.

For the lexical and discursive analysis of the rhetorical steps implementation, both manual procedures of content analysis and automated methods of extracting typical lexemes and stable syntactic constructions were used. To identify the most frequent combinations of words, templates, and lexical patterns, the AntConc 3.5.9 software was used. This program made it possible to identify characteristic word forms, collocations, and contextual templates associated with the implementation of each of the nine rhetorical steps. The analysis was carried out on sub-corpora formed separately for each step based on a preliminary annotation.

3. STUDY RESULTS

3.1. Rhetorical reconstruction: Model structure of the introduction to a scoping review

Based on the step-by-step annotation of the corpus of introductions and the subsequent conceptual analysis, the authors identified and described a stable functional structure of the introduction to a scoping review (Table 4). The proposed model comprises three rhetorical moves, each represented by a set of analytical steps that perform specific discursive functions. The steps are accompanied by typical content elements that reflect the characteristic semantic units observed in the corpus.

Table 4
Functional rhetorical structure of moves and steps in the introduction to a scoping review

MOVE	STEP	FUNCTION	CORE ELEMENTS
Move 1. Establishing the scope as the object of analytical reconstruction	**Step 1.1.** Introducing the scope and outlining its problem landscape	To establish the scope as an object of inquiry by delineating its current boundaries and subject content	(i) Defining the subject field and the boundaries of its examination. (ii) Identifying the key themes, objects, and questions. (iii) Indicating its disciplinary and/ or interdisciplinary orientation. (iv) Specifying the institutional and/ or applied contexts.
	Step 1.2. Diagnosing the epistemological and methodological diffuseness of the subject field	To substantiate the need for reconstructing the scope by pointing to its internal fragmentation	(i) Heterogeneity of concepts and approaches. (ii) Conflicting methodological strategies. (iii) Dispersion of publications[1].
	Step 1.3. Identification of changes enhancing the relevance of reconstruction	To justify the necessity of a scoping review at this stage of scientific knowledge development	(i) External changes (technological, regulatory, political). (ii) Internal shifts (theoretical, methodological). (iii) Shifts in research focus, including seminal publications and conceptual breakthroughs.

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Move 2. Stating the epistemological necessity of a scoping review	**Step 2.1.** Highlighting the limitations of existing syntheses and systematisations	To transform the awareness of fragmentation into a rationale for renewed analytical generalisation	(i) The absence of recent or large-scale reviews. (ii) Constructive critique of prior reviews, such as limited coverage, narrow thematic scope, monodisciplinarity, or obsolescence. (iii) The predominance of descriptive narratives over analytical or conceptual syntheses.
	Step 2.2. Formulation of the research task as a reconstruction of the subject field.	To formulate the research task as the identification of the logic, structural organisation, and latent patterns of development within the field	(i) Aim: to reconstruct the field and identify connections, clusters, trends, and conflicts. (ii) Rationale: a meta-analytical[2] need rather than an empirical gap. (iii) Indication of the review's research perspective: theorisation, typologisation, mapping, or revision.
	Step 2.3. Justification of the relevance of the reconstruction for the scholarly community	To demonstrate the necessity of the review and to indicate the scholarly audience it is intended for	(i) Identification of the target audience (researchers, knowledge policymakers, practitioners). (ii) Value: providing navigation within the subject field, generating new questions, and offering theoretical reconceptualisation.
Move 3 Defining analytical foundations and reconstruction boundaries	**Step 3.1.** Defining the conceptual focus of the review	To define the analytical framework and the strategy for presenting the material	(i) A thematic, conceptual, institutional, or problem-oriented structure[3]. (ii) The principles of grouping or decomposition[4]. (iii) Analytical models that shape the research perspective[5].
	Step 3.2. Identification of the author's epistemological stance	To set the interpretive perspective and demonstrate how the author 'sees' the field.	(i) Authorial stance: positional delineator, critic, integrator. (ii) Mode of analysis: descriptive narrative, problem-oriented critical review, reconfiguration of key concepts.
	Step 3.3. Description of the boundaries of reconstruction and goal setting	To establish the boundaries of observation without reducing them to a purely formal methodology	(i) Justification of the framework as a cognitive decision rather than a technical constraint. (ii) Stating the aim and, where applicable, the research questions.

[1]Publication dispersion is understood as the presence of many heterogeneous sources without cross-referencing; the absence of a cited core in bibliometric maps; the scattering of articles across a wide range of journals belonging to different disciplines; and the lack of methodologically grounded reviews or the dominance of local descriptive accounts.

[2]By meta-analytical we refer to second-order operations typical of reviews (selection, framing, categorisation) that enable reconstruction of a research space; the term is conceptual, not to be confused with statistical meta-analysis.

[3]Type of structuring perspective:
(i) Thematic = articles are grouped according to major research directions.
(ii) Conceptual = the analysis is organised around key concepts and their evolution.
(iii) Institutional = studies are classified by types of institutions, contexts, or educational levels.
(iv) Problem-oriented = the structure is built around unresolved problems, challenges, and conflicts.

[4]The methods of corpus organisation and the logic for distinguishing components of the subject field are specified.
(i) Chronological = the review is divided into temporal stages.
(ii) By methodology = studies are grouped according to methods (quantitative, qualitative, or mixed).
(iii) By the level of analysis = classification into macro-, meso-, and micro-levels.
(iv) By school of thought = division into schools or approaches.
Such principles indicate not just a 'set of topics', but the meta-logic of the review, that is, the grounds on which the reconstruction is carried out.

[5]Epistemological frameworks that make the review coherent:
(i) Mapping or clustering = presents the subject field as a network of themes.
(ii) Axial models = the subject field is represented through oppositions and spectrums.
(iii) Evolutionary framework = the subject field is described in terms of dynamics and development.
(iv) Critical framework = the author introduces an evaluative perspective.

The model presented above encompasses not only the structure of the steps but also their hierarchical distribution across three key rhetorical moves. Each of these moves performs a specific function in the logic of the introduction and is directed toward addressing a particular cognitive task. Taken together, they enable the transition from the initial delineation of the subject field to the argumentation of the rationale of the review and the specification of its analytical parameters.

The overall logic of the distribution of functions among the three rhetorical moves is presented in Table 5 below.

Table 5
Rhetorical moves rationale

MOVE	FUNCTION	QUESTION IT ADDRESSES
1	Delineation of the subject field as an object	What within the existing knowledge of the research area is associated with this subject field, and why does it require critical examination?
2	Cognitive motivation	Why is a new scoping review necessary at this particular moment, and what is its scholarly value?
3	Bases and framework of analysis	On what grounds will the mapping of the subject field be constructed, and within what boundaries?

3.2. Structural parameters of variability: Metrics of stability and cluster organisation

To assess the consistency and variability in the realisation of the reconstructed rhetorical structure of introductions, a quantitative analysis was conducted. It included the calculation of the median Jaccard coefficient, the Gini coefficient, and clustering based on the binary matrix of steps. These metrics made it possible to identify both stable components of the structure and atypical patterns of introduction organisation within the corpus.

The median Jaccard coefficient, calculated based on pairwise overlaps in step realisation across 40 introductions, was 0.63. This value indicates a moderate level of structural similarity between articles, alongside a significant range of variation (from 0.33 to 0.89). Given a nine-step inventory, a median Jaccard of 0.63 indicates that, for a typical pair of introductions with a union of approximately eight realised steps, about five steps are shared (i.e., authors reuse a substantial portion of the same rhetorical functions). Rhetorically, this supports three claims: (i) the presence of a teachable core (Steps 1.1 and 2.2 appear quasi-obligatory); (ii) the existence of optional or stance-sensitive zones (e.g., 3.2), which are unevenly realised across texts; and (iii) pattern reuse rather than template identity — authors tend to realise the same functions with variable sequencing and explication type. Such a result demonstrates that the proposed structure is reproduced in a substantial portion of the corpus, although with different degrees of completeness and sequentiality.

The Gini coefficient was applied to each of the nine rhetorical steps to assess the unevenness of their distribution across the corpus. The highest degree of asymmetry was observed for Steps 2.3 (Justification of the relevance of the reconstruction for the scholarly community) and 3.2 (Identification of the author's epistemological stance), for which Gini values exceeded 0.45, indicating that their realisation was concentrated within a limited number of texts. In contrast, Steps 1.1 (Introducing the scope and outlining its problem landscape) and 2.2 (Formulation of the research task as a reconstruction of the subject field) were found to be the most evenly represented ($G < 0.20$), which confirms their central role in the generic organisation of the introduction.

At the final stage, a cluster analysis was conducted based on a binary matrix of the presence/absence of steps. Applying agglomerative hierarchical clustering, three stable clusters were identified:

(i) Cluster A ($n = 18$) comprises texts that display a complete or nearly complete realisation of all three rhetorical moves, including explicit epistemological positioning and a clearly defined analytical framework.

(ii) Cluster B ($n = 13$) encompasses introductions in which the motivational steps corresponding to Move 2 are weakly represented, although elements of thematic delineation (Move 1) and framework analysis (Move 3) are present.

(iii) Cluster C ($n = 9$) is characterised by minimal structural density. In these introductions, the steps are largely limited to delineating the subject field, while both the conceptual framework and an articulated research task are absent.

Thus, the proposed model of rhetorical structure receives empirical confirmation as a reproducible yet variable schema. At the same time, the differences observed between the clusters make it possible to speak of an intra-generic stratification of introductions to scoping reviews, conditioned by the discursive conventions of journals and by individual authorial strategies.

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3.3. Realisation of rhetorical steps and moves in the corpus

The frequency analysis of rhetorical step realisation demonstrates the degree to which individual steps are reproduced consistently and systematically in the introductions to scoping reviews within the corpus, thereby providing empirical confirmation of the validity of the proposed model. For each of the nine steps, the percentage of realisation was calculated across the corpus of 40 articles (Table 6). The calculation distinguished between full realisation (coded as 1), partial realisation, typically implicit (coded as 0.5), and absence of realisation (coded as 2).

The most consistently reproduced steps are 1.1 (Introducing the scope and outlining its problem landscape) and 2.2 (Formulation of the research task as a reconstruction of the subject field), which indicates their central function in the organisation of the Introduction. At the same time, Steps 1.2 (Diagnosing the epistemological and methodological diffuseness of the subject field) and 1.3 (Identification of changes enhancing the relevance of reconstruction) are realised less frequently, which may suggest either variability in the authors' epistemological assumptions or difficulties in the explicit representation of these steps in the text.

Table 6
Realisation of rhetorical steps in the corpus (n = 40)

STEP	PARTIAL REALISATION (0.5)	FREQUENCY OF REALISATION (1)	ABSENCE OF REALISATION (2)	REALISATION (%)
1.1	0	39	1	97.5
1.2	11	26	3	78.75
1.3	13	24	3	76.25
2.1	5	31	4	83.75
2.2	2	38	0	97.5
2.3	21	15	4	63.7
3.1	14	23	3	75.0
3.2	7	6	27	23.75
3.3	13	19	8	63.74

3.4. Types of rhetorical explication

To represent the modes of rhetorical realisation of the steps within the identified structure of the *Introduction*, it is necessary to examine their qualitative characteristics, namely the specific ways in which each step is rendered in the text. This approach makes it possible to refine the rhetorical specificity of the genre of the scoping review introduction by identifying dominant strategies of authorial expression, stylistic variability, and the degree of formalisation. For this purpose, a typology of rhetorical explication was employed, comprising three principal categories: formulaic, analytical, and implicit. In cases of ambiguity, combined labelling was permitted, but for the purposes of quantitative analysis, only the three principal types were considered.

Table 7 illustrates the distribution of explication types across individual steps. For instance, Step 1.1 (Introducing the scope and outlining its problem landscape) is realised analytically in 88% of cases, which indicates a significant level of authorial involvement and the need for an individualised description of the subject field. By contrast, Step 2.2 (Formulation of the research task as a reconstruction of the subject field) is expressed through formulaic constructions in 60% of cases, reflecting the stability of a genre-specific convention. The highest proportion of implicit realisation is observed in Step 3.2 (Identification of the author's epistemological stance), which corresponds to the high degree of abstraction and contextual dependence characteristic of this step.

3.5. Lexical-discursive patterns of rhetorical steps

This section is devoted to the analysis of the lexical and syntactic devices through which the nine rhetorical steps are realised in the introductions to scoping reviews. Unlike the quantitative distribution or structural configuration of the steps, the focus here is on the lexical and discursive representation of each step, namely on the ways in which the author's key cognitive actions are formulated in the text. For each of the nine steps, the most efficient patterns were manually selected and synthesised from the corpus of 40 texts. The selection was based not on frequency, but on the degree to which the pattern served the

Table 7
Distribution of explication types across rhetorical steps

STEP	FORMULAIC (%)	ANALYTICAL (%)	IMPLICIT (%)
1.1	12.5	87.5	0.0
1.2	18.2	36.4	45.4
1.3	20.0	62.5	17.5
2.1	30.0	55.0	15.0
2.2	60.0	35.0	5.0
2.3	25.0	60.0	15.0
3.1	28.6	50.0	21.4
3.2	15.0	40.0	45.0
3.3	20.0	70.0	10.0

communicative purpose of the step, the clarity of the authorial stance, and the capacity of the phrase to convey the structural function of the utterance within the introduction. These patterns represent the most typical constructions through which authors convey their intentions when enacting a given step in the rhetorical structure of a scoping review introduction.

Table 8 presents the resulting sample for each step, offering one to three patterns that with broad applicability fulfil the intended rhetorical function. These patterns thus capture not only the prevailing discursive preferences of the academic community but also set guidelines for devising genre-relevant linguistic strategies in writing introductions to scoping reviews.

Table 8
Functionally efficient patterns for the description of rhetorical steps (compiled from a corpus of n = 40)

STEP	TYPICAL LEXICAL PATTERNS CHARACTERISTIC OF THE STEP
1.1.	'AI ... *has made* amazing *progress and achievements in the field of* health care ... *In the fields of* nursing, AI *is also playing an important role ...*', '*The scoping literature review on* parent interactions with teachers and schools and the perceptions of both parents and teachers *regarding* school environments...', '*The momentous growth of the field of* online learning... *has resulted in a depth and breadth of research studies and associated information...*'
1.2.	'The *framework of a scoping review* is appropriate... *to examine the current state of research activity and identify gaps...*', 'However, wearable is *an umbrella term that includes* many types of devices. [...] we must *move beyond reviews of* wearables to focus on understanding the effects of different types of wearables.', ''...active forms of participation have been considered more important than passive forms... *researchers have extensively investigated* active forms... Students' reading or lurking behaviour... *has not been investigated...*''
1.3.	'While the benefits of TBL... its application has predominantly been restricted to the preclinical settings... The effectiveness of TBL in this context is less explored...', '*This raises an important question*: are all wearables the same in educational settings? [...] *therefore we must move beyond reviews of* wearables *as a whole...*', '*Given that it has been ten years since* Avraamidou's (2014a) *review was published...* an updated, systematic literature review...'
2.1.	'*Most of the review articles analyse publications that describe* the implementation of game-based approach for learning programming... However, there are some of them tackling other topics... *In our review, we aim to perform the broader analysis...*', 'The use of wearable sensors for education-related applications *is becoming more common, with the first systematic reviews on the topic only emerging recently* [...] to date have been broadly focused on wearables as an umbrella term.', '*There is a paucity of systematic and scoping reviews that examine features of* high-quality online learning in higher education...'

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2.2.	'Therefore, *in this scoping review we focus on the use of* WW in educational *contexts to begin building an understanding of this literature base. We explore the publication trends* [...] for what purposes are WW in educational contexts being employed...', '*The objectives of this paper are firstly to introduce a theoretical framework... Secondly, we undertake a rapid scoping review...*', '*Our aim here is to understand the current use of* these educational innovations... a *scoping review was selected to investigate...*'
2.3.	'*Findings from this review will identify areas for* improvement in online CBL and *highlight a framework for the future direction...*', 'Through exploring these three aspects, *the review aims to provide a detailed understanding of* GenAI's role...', 'Computer *science is a field that is changing very fast*, and the number of games that can be used... is increasing all the time. *As a result, continuous research in this field should be done.*'
3.1.	'*This research aims to elaborate on current trends... It focuses on* the educational level, covered computer science topic, type of the game, purpose for its use, and pedagogical strategies...', '*The analytical framework discussed earlier* in the introduction based on the TAM [...] *was applied to this review.*', 'We *are specifically focused on* the use of wrist-worn wearables (WW) in education. Due to their non-intrusive nature, accessibility, frequent compatibility with smartphones, and widespread adoption...'
3.2.	'As an academic (or educational) developer with a focus on supporting SoTL engagement, I have observed this discomfort...', 'The purpose of Carl May's general theory of implementation is to help facilitate both prospective understanding...', '*to identify and synthesise these instruments into a cohesive body of knowledge...*'
3.3.	'*in this review, we are specifically focused on the* use of wrist-worn wearables (WW) in education. [...] *what types of data are being collected and how are they being analysed*', '*we focus on* the STEM disciplinary setting and US legislative context... *Our primary purposes were to examine the extent, range and nature of* scholarship...', '*This scoping review aims to describe the* life skills programmes implemented [...] *between* 2001 *and* 2021...' '*We aimed to evaluate the existing literature... to scope the targets...*'

At the stage of lexical-discursive analysis, an automated corpus search for recurrent linguistic constructions was conducted using AntConc 3.5.9. The process was aimed at identifying typical syntactic and lexical patterns through which each of the nine rhetorical steps is realised, including their formalised or formulaic expressions. Such a strategy resulted in establishing the set of stable patterns recurring across multiple articles and comparing the degree of conventionality and variation both within and across steps. For each step, the corpus was examined to extract key verb—noun constructions, structural phrase patterns, and signalling expressions that authors employ to mark the research problem, to account for the methodological diffuseness of the subject field, to delineate the scope of the review, and so forth. The results of this analysis are presented in Table 9. This table specifies the following: typical linguistic constructions (in some cases reproduced verbatim if they occurred at least twice in the corpus); typical lexical-syntactic patterns (for example, the clichés *'a growing body of literature...', this review aims to...', 'there is limited understanding of...'*); and semantic markers indicating distinctive phrases at a particular step.

The findings suggest the presence of stable linguistic strategies that are typical of the genre of introductions to scoping reviews. At the same time, variation was observed in the degree of formalisation. The highest concentration of formulaic expressions occurs in steps associated with stating the aim (2.2), formulating the focus (3.1), and describing the relevance of the review (2.3). By contrast, epistemological positioning (3.2) and diagnosing methodological diffuseness (1.2) are more frequently expressed in analytical and implicit forms.

The automated analysis complements the manual typology and reinforces the claim of a genre-stable nature of rhetorical steps, providing an empirical basis for future pedagogical, linguistic, and bibliometric investigations of scoping review introductions.

4. DISCUSSION

The findings of the study made it possible to reconstruct and empirically substantiate a three-move rhetorical structure of the introduction to a scoping review. This structure comprises nine steps, each performing a specific cognitive and genre-related function. The model was developed by analysing the corpus of 40 English-language scoping reviews published in leading international journals. Unlike universal models such as 'Creating a Research Space' (CARS) (Swales, 1990), it is adapted to the genre of the scoping review, which is aimed at the analytical reconstruction of a research domain within a defined problem area. Whereas CARS models reveal how research article introductions create a niche for a new empirical contribution, our model formalises the review-level, second-order mission of scoping review introductions: motivating synthesis, defining boundaries and frameworks, and (optionally) positioning the author's epistemological stance. It adds review-specific steps (e.g., 1.1 scope nomination, 2.2 task as reconstruction, boundary setting, 3.2

Table 9
Lexical-discursive patterns for each rhetorical step

STEP	FUNCTIONAL VERBS	FUNCTIONAL ADJECTIVES	FUNCTIONAL NOUNS	CORPUS-BASED LEXICAL-DISCURSIVE PATTERNS
1.1. Introducing the scope and outlining its problem landscape	introduce, define, explore, highlight, focus on	key, emerging, interdisciplinary	field, research, knowledge, literature, domain	The field of X has gained increasing attention due to...
1.2. Diagnosing the epistemological and methodological diffuseness of the subject field		diverse, conflicting, fragmented, inconsistent	frameworks, perspectives, definitions, approaches, understandings	There is a wide variation in how X is conceptualised across studies...
1.3. Identification of changes enhancing the relevance of	shift, reshape, transform, emerge, evolve	recent, ongoing, technological, structural	challenges, developments, trends, changes, contexts	Recent technological advances have reshaped the landscape of...
2.1. Highlighting the limitations of existing syntheses and systematisations	lack, overlook, limit, miss, fail	limited, narrow, outdated, insufficient	reviews, syntheses, mappings, analyses	Previous reviews have provided only a partial picture of...
2.2. Formulation of the research task as a reconstruction of the subject field	aim, map, synthesise, explore, identify, reconstruct	comprehensive, integrative, systematic	patterns, connections, clusters, dimensions, trends	This review aims to systematically map the development of...
2.3. Justification of the relevance of the reconstruction for the scholarly community	inform, guide, support, contribute, facilitate	relevant, practical, useful, foundational	practice, policy, decision-making, theory, agenda	This synthesis is intended to inform both researchers and practitioners in...
3.1. Defining the conceptual focus of the review	structure, organise, frame, classify, categorise	thematic, conceptual, disciplinary, comparative	framework, model, perspective, dimension	We structure the review around three conceptual dimensions...
3.2. Identification of the author's epistemological stance	adopt, assume, position, approach, integrate	critical, constructivist, interdisciplinary	stance, lens, position, orientation, framework	This review adopts a critical perspective to assess...
3.3. Description of the boundaries of reconstruction and goal setting	delimit, constrain, define, scope, focus	empirical, focused, bounded, transparent	boundaries, scope, objectives, limits, questions	This review focuses specifically on peer-reviewed empirical studies published after 2015...

epistemological positioning), quantitative evidence of their co-occurrence structure, and ready-to-use linguistic templates for step realisation.

The most stable steps in the corpus proved to be those associated with the nomination of the subject field (1.1), the formulation of the reconstruction task (2.2), and the specification of the conceptual framework of analysis (3.1). This pattern aligns with the core requirements of an academic introduction, namely a clearly defined object, a stated purpose, and a transparent structure (Feak & Swales, 2011; Hartley, 2008). By contrast, steps linked to epistemological reflection and the delineation of analytical boundaries (1.2, 3.2, 3.3) were represented far less frequently, despite their theoretical importance for the genre. This observation supports the hypothesis that latent genre conventions constrain the explicit expression of authorial epistemological stance and the limits of analytical coverage in scoping reviews. Unlike introductions in philosophical or sociological studies, where such reflexivity is often regarded as a marker of theoretical maturity (Hyland, 2018;

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Hood, 2010), in the context of systematising reviews it may be perceived as a deviation from a norm that favours objectified and generalised presentation of material.

Despite the common perception of the scoping review as a genre aimed at the objective and neutral systematisation of knowledge (Arksey & O'Malley, 2005; Levac et al., 2010), any reconstruction of a research space inevitably involves elements of selection, interpretation, and framing. In our corpus, Step 1.1 (scope nomination) and Step 2.2 (task as reconstruction) are realised in ≥ 97% of introductions (Table 6), indicating a teachable core of review-level framing rather than empirical gap-making. By contrast, explicit Step 3.2 (epistemological positioning) occurs in 23.8% of texts (Table 7) and shows high Gini asymmetry, marking stance as optional/uneven rather than canonical. The median Jaccard = 0.63 (Section 3.2) further supports pattern reuse with variable sequencing/explication (formulaic vs analytical vs implicit; see Table 9). Cluster analysis corroborates this asymmetry: Cluster A realises the full three-move pattern, Cluster B attenuates Move 2, and Cluster C concentrates on Move 1 with minimal analytical scaffolding (Section 3.2). These observations explain why claims of 'neutral systematisation' coexist with authorial framing choices: the core is stable, while stance-related operations remain discipline- and venue-conditioned. As scholars of academic writing emphasise (Feak & Swales, 2011; Hyland, 2018), claims of complete 'impartiality' in academic discourse are best understood as rhetorical constructs that may background epistemological preferences, methodological assumptions, and analytical focuses under the appearance of neutrality. In the context of a scoping review, even when criteria of systematicity and representativeness are observed, the author must make decisions about which sources to include, which dimensions of analysis to treat as relevant, which contradictions or gaps to highlight, and which to leave aside (Thomas et al., 2019; Mak & Thomas, 2022b). These decisions can never be entirely 'objective' since they are grounded in a particular research stance (Thomas et al., 2019; Mak & Thomas, 2022b). For this reason, the explicit articulation of such a stance, for example, in the form of identifying the epistemological framework (Step 3.2) or clarifying the boundaries of the reconstruction (Step 3.3), does not undermine scholarly integrity but rather enhances the transparency and reproducibility of the analysis.

Moreover, the omission of an explicit authorial stance fosters the illusion of universality and exhaustive comprehensiveness, a perception that is particularly problematic in subject fields that are fragmented, interdisciplinary, or conceptually heterogeneous. In such cases, acknowledging a partial perspective and the limitations of the reconstruction is deemed as a sign of theoretical maturity, consistent with the principles of critically oriented science (Guinda & Hyland, 2012; Peng, 2019). Thus, authorial positioning in a scoping review should not be regarded as a subjective intrusion that conflicts with genre conventions. Rather, it serves as a means of academic responsibility, enabling readers to situate the reconstruction in relation to its analytical and theoretical grounding.

It is crucial to distinguish the rhetorical functions of references to previous reviews across different sections of a paper. In the *Introduction*, such references (Move 1, Step 2) serve primarily a critical and diagnostic function. They are employed to indicate the extent to which the subject has been studied and to highlight epistemological gaps that justify the rationale for the present review. In this context, the reference functions as the part of the argumentative framework aimed at legitimising the purpose and objectives of the study. It reflects the pragmatics of scarcity and establishes the epistemological motivation for the research.

In the *Discussion* section of a scoping review (Move 4), references to previous reviews fulfil a different rhetorical role. They become instruments of interpretation and positioning of the findings. At this stage, the author relates the structure of the reconstructed subject field that was revealed through the analysis to earlier attempts to describe the research domain (Tikhonova et al., 2025). Such references are directed not toward problematisation but toward comparison and refinement. They enable the identification of points of convergence, divergence, and potential extensions of existing models. In this context, prior reviews are not treated as sources of limitation but as benchmarks for discussing the novelty and validity of the current study results.

The typological analysis of rhetorical explication revealed a predominance of the analytical form over the formulaic one, particularly in those rhetorical steps that are directly linked to the research design of the review (2.2, 3.1). This tendency aligns with the shift observed in rhetorical studies toward greater authorial agency and metadiscursive control in the structure of academic reviews (Guinda & Hyland, 2012; Peng, 2019; Xie, 2020). At the same time, the considerable presence of formalised, recurring clichés, especially in Step 1.1, indicates the persistence of stable genre formulas, which is consistent with findings from corpus-based studies of academic rhetoric (Biber et al., 2021; Flowerdew, 2012; Charles, 2006). Thus, the discourse of the review balances between creative reconstruction and normative predictability, which is a characteristic feature of highly regulated genres of academic writing.

The high proportion of analytically realised rhetorical steps observed in the corpus may seem unexpected considering the widely discussed issue in the research literature concerning the limited argumentative maturity of academic writing, especially among early-career researchers (Peng, 2019). However, this result appears well justified when the specificity of the selected corpus is considered,

since it included only articles published in leading international journals ranked in the first quartile (Q1). Such journals impose heightened requirements on structural and rhetorical elaboration, and the processes of multi-level peer review and editorial supervision contribute to aligning the quality of execution with normative models of academic writing. In this respect, the predominance of the analytical type of step explication should be interpreted not as a general practice but as a reflection of a genre-preferred model institutionalised in high-level scientific publications. This clarification is particularly important for the correct transfer of the model to less representative corpora or to educational contexts where the degree of analytical density may be considerably lower.

The application of lexical-discursive analysis provided additional confirmation of the functional differentiation of the steps. For instance, the steps associated with problematisation, and the indication of the subject field diffuseness (1.2, 2.1) were marked by a high frequency of lexemes signalling uncertainty, fragmentation, and criticality, such as *fragmented, inconsistent, lack,* and *challenge.* By contrast, Steps 2.2 and 3.1 displayed a predominance of constructions that establish the research frame, including *aim to, this review maps,* and *we categorise.* This supports the hypothesis that the rhetorical functions of the steps directly correlate with their verbal realisation and that within a single genre a discursive lexicon can emerge ensuring the recognisability of textual functions (Ädel, 2006; Flowerdew, 2015; Komninos, 2025; Farnia & Barati, 2017).

Comparison with more general rhetorical models highlights the specificity of introductions in scoping reviews. Unlike the Create a Research Space (CARS) model, where the main emphasis is placed on the establishment of a research gap and the substantiation of novelty, the present model prioritises cognitive mapping: the description of research configurations, their transformations, and the rationale for analytical intervention. In this respect, the proposed genre-based rhetorical model of the scoping review introduction is conceptually aligned with approaches developed within scientometrically oriented genre analysis (Teufel et al., 2009; Feak & Swales, 2011), where the introduction is regarded not as a mere prologue but as a structuring element that performs the functions of cognitive selection and methodological focusing. Similar to an optical lens, the introduction focuses on specific aspects of the subject field, sets the trajectory of subsequent reconstruction, and defines the theoretical and methodological parameters of interpretation. At the same time, it functions as a meta-analytical, review-level filter, enabling the author to legitimise the inclusion or exclusion of sources, justify the criteria for systematisation, and articulate the epistemological foundations of the analytical scope. This understanding of the introduction corresponds to contemporary linguistic, informational, and bibliometric practices in which the genre structure of the scholarly text is analysed as a key reference point for the automated extraction of argumentative logic and rhetorical functions.

Because the corpus is discipline-bound, our estimates of step frequencies and co-occurrence structure should be viewed as field-specific. We hypothesise partial transferability to adjacent review-intensive domains, but cross-disciplinary validation remains an avenue for future work.

5. IMPLICATIONS

Pedagogical implications. The three-move, nine-step schema can be operationalised as a short, assessable learning routine that targets the genre-specific core identified in this study. This routine shifts the model from descriptive account to teachable procedure, aligning evaluation criteria with the empirically validated step distribution.

Prospective computational implications. The step-based schema is, in principle, compatible with move-aware tooling. Future work could operationalise the model by curating cue patterns from published introductions to propose candidate spans for Step 1.1 (scope nomination) and Step 2.2 (task as reconstruction), and sentence-level indicators related to Step 3.2 (epistemological positioning). Such prototyping would be strictly prospective and external to the current dataset and coding, which are limited to rhetorical steps. Future work could operationalise the model by curating cue inventories from published introductions to hypothesise candidate spans for Step 1.1 (scope nomination) and Step 2.2 (task as reconstruction), as well as sentence-level indicators associated with Step 3.2 (epistemological positioning).

6. CONCLUSION

The genre-based rhetorical model of the scoping review introduction presented in this article has a dual heuristic value. First, it can be effectively employed in educational contexts as a tool for developing students' and early-career researchers' competencies in academic writing, particularly in fostering structured, argument-driven, and purpose-oriented presentation of scholarly content. Second, it demonstrates substantial potential for applications in digital linguistics. The reconstructed discursive patterns and syntactic templates can serve as a foundation for algorithmic tasks such as automatic annotation and rhetorical tagging of scholarly texts. This, in turn, supports the advancement of corpus linguistics, genre modelling, and bibliometric analysis. The findings open a pathway toward the integration of linguistic models and machine learning technologies, enabling more precise and interpretable recognition of the functional structure of scholarly papers.

The limitations of this study include the restriction of the sample to high-ranking English-language journals in the subject field of education, which may have influenced

the identified patterns as a result of the convergence of academic norms. In addition, although manual annotation was carried out with a high level of inter-annotator agreement, the possibility of subjective bias cannot be fully excluded. To enhance the findings' reliability, automated validation on larger and more diverse corpora is required.

The proposed genre-based rhetorical model should be regarded as a preliminary heuristic that requires further conceptual refinement and empirical validation on a broader corpus of texts. In constructing the model, the authors relied not only on discourse analysis but also on extensive experience as journal editors and reviewers. The process of engaging with manuscripts that do not fit into the existing genre scheme of the scoping review made evident the existence of stable, yet insufficiently described, rhetorical patterns that require separate theoretical elaboration. The presented model functions as a tool that reflects established practices of academic writing and may serve as a foundation for further typologisation.

There are three key directions for future research. First, the model may be applied to other genres, such as theoretical articles, to test its transferability beyond scoping reviews. Second, it should be compared with introductions in less consolidated disciplines, such as anthropology and cultural studies, where boundaries of the research space are more fluid. Third, cross-cultural analysis of step realisations in academic writing across different languages would provide valuable insights. Comparative investigation of how epistemological and institutional foundations of reconstruction are articulated in diverse research traditions may yield significant contributions to understanding genre variability and rhetorical conventions.

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Appendix 1. Journals demographics

NO.	TITLE	SJR	ISSN	SJR	h-INDEX	PUBLISHER	COUNTRY
1.	Computers and Education: Artificial Intelligence	Q1	2666920X	5,217	51	Elsevier B.V.	NL
2.	International Journal of Educational Technology in Higher Education	Q1	23659440	3,912	77	Springer Netherlands	NL
3.	International Journal of STEM Education	Q1	21967822	2,606	63	SpringerOpen	SZ
4.	Smart Learning Environments	Q1	21967091	2,476	41	SpringerOpen	UK
5.	JMIR Medical Education	Q1	23693762	1,974	36	JMIR Publications Inc.	CA
6.	Computers and Education Open	Q1	26665573	1,678	25	Elsevier Ltd.	UK

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7.	Australasian Journal of Educational Technology	Q1	14493098 14495554	1,249	75	Australasian Society for Computers in Learning in Tertiary Education	AUS
8.	Medical Education Online	Q1	10872981	1,037	55	Taylor and Francis Ltd.	UK
9.	BMC Medical Education	Q1	14726920	0,947	107	BioMed Central Ltd	UK
10.	Journal of University Teaching and Learning Practice	Q1	14499789	0,909	28		AUS
11.	Online Learning Journal	Q1	24725730 24725749	0,821	75	The Online Learning Consortium	US
12.	International Journal of Educational Research Open	Q1	26663740	0,758	22	Elsevier Ltd	UK
13.	American Journal of Pharmaceutical Education	Q1	15536467, 00029459	0,736	85	Elsevier B.V.	US
14.	Education Sciences	Q1	22277102	0,73	68	Multidisciplinary Digital Publishing Institute (MDPI)	SZ
15.	Journal of Information Technology Education: Research	Q1	15393585, 15479714	0,712	38	Informing Science Institute	US

Appendix 2. Coding table

NO.	TITLE	ARTICLE	CODE
1.	Computers and Education: Artificial Intelligence	Marx, E., Leonhardt, & Bergner, N. (2023). Secondary school students' mental models and attitudes regarding artificial intelligence: A scoping review. *Computers and Education: Artificial Intelligence, 5,* 100169. https://doi.org/10.1016/j.caeai.2023.100169	1_1
		Joksimovic, S., Ifenthaler, D., Marrone, R., De Laat, M., & Siemens, G. (2023). Opportunities of artificial intelligence for supporting complex problem-solving: Findings from a scoping review. *Computers and Education: Artificial Intelligence, 4,* 100138. https://doi.org/10.1016/j.caeai.2023.100138	1_2
2.	International Journal of Educational Technology in Higher Education	Xia, Q., Weng, X., Ouyang, F., Lin, T. J., & Chiu, T. K. F. (2024). A scoping review on how generative artificial intelligence transforms assessment in higher education. *International Journal of Educational Technology in Higher Education, 21,* 40. https://doi.org/10.1186/s41239-024-00468-z	2_1
		Topping, K. J., Gehringer, E., Khosravi, H., Srilekha Gudipati, Jadhav, K., & Surya Susarla. (2025). Enhancing peer assessment with artificial intelligence. *International Journal of Educational Technology in Higher Education, 22,* 3. https://doi.org/10.1186/s41239-024-00501-1	2_2
3.	International Journal of STEM Education	Zhai, Y., Tripp, J., & Liu, X. (2024). Science teacher identity research: a scoping literature review. *International Journal of STEM Education, 11,* 20. https://doi.org/10.1186/s40594-024-00481-8	3_1
		Videnovik, M.,Vold, T., Kiønig, L., Bogdanova, A. M., & Trajkovik. V. (2023). Game-based learning in computer science education: a scoping literature review. *International Journal of STEM Education, 10,* 54. https://doi.org/10.1186/s40594-023-00447-2	3_2
		Borrego, M., Chasen, A., Tripp, H. C., Landgren, E., & Koolman, E. (2025). A scoping review on U.S. undergraduate students with disabilities in STEM courses and STEM majors. *International Journal of STEM Education, 12,* 2. https://doi.org/10.1186/s40594-024-00522-2	3_3

4.	Smart Learning Environments	Yang, D., Wang, H., Metwally, A. H. S., & Huang, R. (2023). Student engagement during emergency remote teaching: A scoping review. *Smart Learning Environments, 10*, 24. https://doi.org/10.1186/s40561-023-00240-2	4_1
		Meenaghan, A., & van Sintemaartensdijk, I. (2024). The use of XR technology in criminal justice teaching and education: a scoping review. *Smart Learning Environments, 11,* 60. https://doi.org/10.1186/s40561-024-00351-4	4_2
5.	JMIR Medical Education	Lie, S. S., Helle, N., Sletteland, N. V., Vikman, M. D., & Bonsaksen, T. (2023). Implementation of Virtual Reality in Health Professions Education: *Scoping Review. JMIR medical education, 9*, e41589. https://doi.org/10.2196/41589	5_1
		Zhou, Y., Li, S. J., Tang, X. Y., He, Y. C., Ma, H. M., Wang, A. Q., Pei, R. Y., & Piao, M. H. (2024). Using ChatGPT in Nursing: Scoping Review of Current Opinions. *JMIR medical education, 10*, e54297. https://doi.org/10.2196/54297	5_2
		Mainz, A., Nitsche, J., Weirauch, V., & Meister, S. (2024). Measuring the Digital Competence of Health Professionals: Scoping Review. *JMIR medical education, 10*, e55737. https://doi.org/10.2196/55737	5_3
6.	Computers and Education Open	Cumming, T. M., Han, C., & Gilanyi, L. (2024). University student and instructor experiences with HyFlex learning: A scoping review. *Computers and Education Open, 7*, 100229. https://doi.org/10.1016/j.caeo.2024.100229	6_1
		Schroeder, N. L., Romine, W. L., & Kemp, S. E. (2023). A scoping review of wrist-worn wearables in education. *Computers and Education Open, 5,* 100154. https://doi.org/10.1016/j.caeo.2023.100154	6_2
7.	Australasian Journal of Educational Technology	Bowers, P., Graydon, K., Ryan, T., Lau, J. H., & Tomlin, D. (2024). Artificial intelligence-driven virtual patients for communication skill development in healthcare students: A scoping review. Australasian *Journal of Educational Technology, 40*(3), 39—47. https://doi.org/10.14742/ajet.9307	7_1
		McInnes, R., Hobson, J. E., Johnson, K. L., Cramp, J., Aitchison, C., & Baldock, K. (2024). Online course quality evaluation instruments: A scoping review. Australasian *Journal of Educational Technology, 40*(2), 55—75. https://doi.org/10.14742/ajet.8978	7_2
8.	Medical Education Online	Tonheim, L. E., Molin, M., Brevik, A., Malene Wøhlk Gundersen, & Garnweidner-Holme, L. (2024). Facilitators and barriers to online group work in higher education within health sciences — A scoping review. *Medical Education Online, 29*, 2341508. https://doi.org/10.1080/10872981.2024.2341508	8_1
		Koelewijn, G., Hennus, M. P., Kort, M., Frenkel, J., & Thijs van Houwelingen. (2024). Games to support teaching clinical reasoning in health professions education: Ascoping review. *Medical Education Online, 29,* 2316971. https://doi.org/10.1080/10872981.2024.2316971	8_2
9.	BMC Medical Education	Sterpu, I., Herling, L., Nordquist, J., Rotgans, J. I., & Acharya, G. (2024). Team-based learning (TBL) in clinical disciplines for undergraduate medical students—A scoping review. *BMC Medical Education, 24,* 18. https://doi.org/10.1186/s12909-023-04975-x	9_1
		Zhang, R., Xu, X., Luo, X., & Huang, P. (2024). 'Building bridges'—communication education for residents in radiology: A scoping review. *BMC Medical Education, 24,* 662. https://doi.org/10.1186/s12909-024-05660-3	9_2
		Gamborg, M. L., Salling, L. B., Rölfing, J. D., & Jensen, R. D. (2024). Training technical or non-technical skills: an arbitrary distinction? A scoping review. *BMC Medical Education, 24,* 1451. https://doi.org/10.1186/s12909-024-06419-6	9_3
		Donkin, R., Yule, H., & Fyfe, T. (2023). Online case-based learning in medical education: A scoping review. *BMC Medical Education, 23,* 564. https://doi.org/10.1186/s12909-023-04520-w	9_4

		Hosseini, A., Ghasemi, E., Nasrabadi, A. N., & Sayadi, L. (2023). Strategies to improve hidden curriculum in nursing and medical education: A scoping review. *BMC Medical Education, 23,* 658. https://doi.org/10.1186/s12909-023-04652-z	9_5
		Lesunyane, A., Ramano, E., Niekerk, K. van, Boshoff, K., & Dizon, J. (2024). Life skills programmes for university-based wellness support services for students in health sciences professions: A scoping review. *BMC Medical Education, 24,* 1418. https://doi.org/10.1186/s12909-024-06162-y	9_6
10.	Journal of University Teaching and Learning Practice	Dobbins, K. (2024). Applying an Academic Literacies Lens to the Scholarship of Teaching and Learning (SoTL): A Scoping Review. *Journal of University Teaching and Learning Practice, 21*(5).	10_1
		Killingback, C., Tomlinson, A., & Stern, J. (2024). Compassionate pedagogy in higher education: A scoping review. *Journal of University Teaching and Learning Practice, 21*(10). https://10.53761/7yvrw787	10_2
11.	Online Learning Journal	Meyer, H. S., Preisman, K. A., Samuel, A. (2022). Get connected: A scoping review of advising online graduate students. *Online Learning, 26*(3), 274-292.	11_1
		Choi, H., & Hur, J. (2023). Passive participation in collaborative online learning activities: A scoping review of research in formal school learning settings. *Online Learning, 27*(1), 127-157. https://doi.org/10.24059/olj.v27i1.3414	11_2
		Wright, A. C., Carley, C., Alarakyia-Jivani, R., & Nizamuddin, S. (2023). Features of high quality online courses in higher education: A scoping review. *Online Learning, 27*(1), 46-70. https://doi.org/10.24059/olj.v27i1.3411	11_3
12.	International Journal of Educational Research Open	Bulfone, G., Bressan, V., Zerilli, I., Favara, G., Magnano, R., Mazzotta, R., Barchitta, M., Alvaro, R., & Agodi, A. (2024). Nursing students' health literacy skills: A scoping review for driving research. *International Journal of Educational Research Open, 7,* 100379. https://doi.org/10.1016/j.ijedro.2024.100379	12_1
		Gahagan, J., Slipp, N., Chowdhury, R., Kirby, D., Smith, S., McWilliam, S., Carter, N., Anderson, K., Chughtai, S., Robinson, M., & Mueller, R. E. (2023). Reducing barriers to post-secondary education among former youth in care: A scoping review. *International Journal of Educational Research Open, 5,* 100303. https://doi.org/10.1016/j.ijedro.2023.100303	12_2
13.	American Journal of Pharmaceutical Education	Moote, R., Kennedy, A., Ratcliffe, T., Gaspard, C., Leach, E. R., Vives, M., & Zorek, J. A. (2023). Clinical interprofessional education in inpatient pharmacy: Findings from a secondary analysis of a scoping review. *American Journal of Pharmaceutical Education, 88,* 100617. https://doi.org/10.1016/j.ajpe.2023.100617	13_1
		Soueid, R., Michael, T.J.F., Cairns, R., Charles, K. A., & Stocker, S. L. (2024). A scoping review of pharmacogenomic educational interventions to improve knowledge and confidence. *American Journal of Pharmaceutical Education, 88*(3), 100668. https://doi.org/10.1016/j.ajpe.2024.100668	13_2
		McLean, M., Bogle, D., Diggins, C., MacInnis, M., MacDonald, A., & Wilby, K. J. (2024). A scoping review of interprofessional education training aimed to improve 2SLGBTQ+ health. *American Journal of Pharmaceutical Education, 88*(4), 100683. https://doi.org/10.1016/j.ajpe.2024.100683	13_3
14.	Education Sciences	Witte, V., Schwering, A., & Frischemeier, D. (2025). Strengthening data literacy in K-12 Education: A scoping review. *Education Sciences, 15*(1), 25. https://doi.org/10.3390/educsci15010025	14_1
		Simon, P. D., & Zeng, L. M. (2024). Behind the scenes of adaptive learning: A scoping review of teachers' perspectives on the use of adaptive learning technologies. *Education Sciences, 14*(12), 1413. https://doi.org/10.3390/educsci14121413	14_2

		Pennington, S. E., Tang, J. H., Divoll, K., & Correll, P. (2024). A scoping literature review on parent interactions with teachers and school environments at the middle level. *Education Sciences, 14*(12), 1364. https://doi.org/10.3390/educsci14121364	14_3
15.	Journal of Information Technology Education: Research	Fokides, E., & Lagopati, G. (2024). The utilization of 3D printers by elementary-aged learners: A scoping review. *Journal of Information Technology Education: Innovations in Practice, 23,* Article 6. https://doi.org/10.28945/5288	15_1
		Essien, G., & Parbanath, S. (2024). Exploring the world of robot-assisted digital storytelling: Trends, models, and educational implications. *Journal of Information Technology Education: Research, 23,* Article 27. https://doi.org/10.28945/5378	15_2
		Msweli, N. T., Mawela, T., & Twinomurinzi, H. (2023). Data science education — A scoping review. *Journal of Information Technology Education: Research, 22*, 263-294. https://doi.org/10.28945/5173	15_3

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